Teaching Plan

T. Y. B. Sc. - Botany: 2023 - 24

BO: 351 Cryptogamic Botany

(Semester– V; Paper – I)

Sr. No	Month	Topics
1	August	**Introduction**: Cryptogams- meaning. Types- Lower Cryptogams, brief Review with examples **Algae**: General characters, distribution, Thallus organization, habit and Habitat reproduction and Classification (G.M.Smith 1955) up to classes.
2	September	**Study of life cycle** of algae with reference to taxonomic position, Occurrence, Thallus structure, and reproduction of Nostoc, *Oedogonium Chara*, *Sargassum* and Batrachospermum. Economic importance of algae- Role in industry, agriculture, fodder and medicine. **Revision and Assignment**
3	October	**Fungi:** General characters, Habit and habitats, thallus organization, cell wall composition, nutrition and Classification. (Alexopoulos and Mims 1979) up to classes. Study of life cycle of fungi with reference to taxonomic position, thallus structure, and reproduction of Mucor (Zygomycotina), *Saccharomyces* (Ascomycotina), *Puccinia* (Basidiomycotina), *Penecillium* and *Cercospora* (Deuteromycotina) [Two members of Deutero.] Symbiotic Associations - Lichens, *Mycorrhiza* and their significance **Theory Internal Exam**
4	November	**Revision and Assignment** **Practical Internal and External Exam** **Question paper discussion**

Prof. P. D. Kad

Teaching Plan

T. Y. B. Sc. - Botany: 2023- 24

BO.353: Spermatophyta and Palaeobotany
(Semester– V; Paper – III)

Sr. No	Month	Topics
1	August	**Introduction to Gymnosperms** General characters, economic importance and classification according to Chamberlain (1934).
2	September	**Study of life cycle of *Pinus*** with reference to distribution,morphology, anatomy, reproduction, gametophyte, sporophyte, seed structure and alternation of generations. **Revision and Assignment**
3	October	**Study of life cycle of *Gnetum*** with reference to distribution, morphology, anatomy, reproduction, gametophyte, sporophyte, seed Structure and alternation of enerations. **Fossil-** Definition, process of fossil formation, types of fossils. -Impression, Compression, Petrifaction, Pith cast and Coal ball. **Origin of angiosperms:**with reference to time, place and ancestry- 1) Pseudanthial theory 2) Transitional-Combinational Theory **Classification:** Outline, Merit and Demerits of Cronquist's System and APG IV system of classification. Study of following families with reference to systematic position (As per Bentham & Hooker), Diagnostic characters,floral formula, floral diagram and any five examples with their economic importance – Nymphaeaceae, Oleaceae, Amaranthaceae, Cannaceae **Revision and Assignment** **Theory Internal Exam**
4	November	**Herbaria and Botanical Gardens** Functions of Herbarium, Important herbaria (World: Kew herbarium; India: Central National Herbarium, Kolkata). Botanic gardens of the world (Royal Botanic Garden, Kew) and India **Revision and Assignment** **Speciation & Endemism** Species concept (Biological, Taxonomic & Phylogenetic Species Concept), Speciation (Allopatric, Sympatric &Parapatric), Endemism and its types (Palaeoendemism, Holoendemism and Neoendemism) **Practical Internal Exam** **Question paper discussion**

Dr. Sangeetha J. S.

Teaching Plan

T. Y. B. Sc. - Botany: 2023-24

BO.354: Plant Ecology

(Semester– V; Paper – IV)

Sr. No	Month	Topics
1	August	**Introduction**, interrelationship between the living world and the environment, levels of organization, components and dynamism of ecosystem, homeostasis, niche concept, concept of limiting factors **Biogeography**: Floristic realms, speciation and its types, biogeographic regions of India,Plant indicators Population ecology:Definition, characteristics, population growth form, r and k selection
2	September	**Community ecology**: Introduction and Definition, community structure, physiognomy, Raunkiaer's life form classification, keystone species, edge and ecotone Biogeochemical cycles: The carbon cycle, Nitrogen cycle, Phosphorus cycle, and Hydrologic cycle Ecological Impact Assessment (**EIA**) Introduction, Historical Review of EIA, Objectives of EIA, Stages of EIA process: Screening; Scoping; Baseline study; Impact prediction and assessment; Mitigation; Producing Environmental Impact Statement (EIS); EIS review; Decision making; Monitoring, Compliance and Enforcement; Benefits of EIA.
3	October and November	Environmental Audit Meaning and concept, need, objectives, benefits, types, audit protocol, process, certification, personnel environmental audit Remote Sensing Definition, basic principles, process of ecological data acquisition and interpretation, global positioning system,application of remote sensing in ecology. Ecological management: Concepts, sustainable development, sustainability indicators **Revision, Seminars and Question paper discussion** **Theory Internal Exam** **Practical Internal Exam**

Prof. P. D. Kad.

Teaching Plan

T. Y. B. Sc. - Botany: 2023-24

BO.355: Cell and Molecular Biology

(Semester– V; Paper – V)

Sr. No	Month	Topics
1	August	**Introduction to Cell** **Biology**: Definition, Brief history of Cell Biology, Units of measurement for cell, Interdisciplinary nature of Cell Biology **Cell organelles**: Ultrastructure, components and functions of Cell wall and cell membranes, mitochondria and Chloroplast, endoplasmic Reticulum, Golgi apparatus, Lysosomes, Vacuoles
2	September	**Nucleus**: Morphology and ultrastructure of nucleus, nucleolus and nucleolar organizer nuclear envelope – structure of nuclear pore complex, transport of molecules across nuclear envelope. **Chromosomes**: Euchromatin and heterochromatin Histones, Packing of DNA into chromosomes in eukaryotes, Karyotype and ideogram, Polytene chromosomes and lampbrush chromosomes.
3	October and November	**Genetic material DNA**: historical perspective from 1953 to 2020, Griffith's and Avery's transformation experiments, Hershey-Chase bacteriophage experiment. DNA replication (Prokaryotes and Eukaryotes): Molecular mechanism of DNA replication. Enzymes involved in both prokaryotic and eukaryotic DNA replication and their inhibitors (antibiotics). **Gene expression**:Transcription (Prokaryotes in details and passing remarks on Eukaryotes) Types of RNA: mRNA, tRNA, rRNA; **Theory Internal Exam** Types of promoters; types of RNA polymerase enzymes in eukaryotes; molecular mechanism of transcription. **Translation** (Prokaryotes and Eukaryotes): Definition, concept and properties of genetic code; molecular mechanism of translation. **Regulation of gene expression**: Concept of operon, *lac* operon and *trp* operon, positive and negative control, one gene one enzyme hypothesis. **Cell signaling:** Introduction and definition, Signaling molecules and receptors, Calcium signaling pathway in plants **Theory and Practical Internal, External Exam** **Revision, Question paper discussion**

Dr. S.M.Jagtap

Teaching Plan
T. Y. B. Sc. - Botany: 2023-24
BO: 333: Genetics and Evolution
(Semester– III; Paper – III)

Sr. No	Month	Topics
1	August	**Introduction to Genetics. History, Definition, Concept, branches and applications of Genetics.** Mendelism Genetical terminology, Monohybrid cross, Law of dominance, Incomplete dominance, Law of segregation, Dihybrid cross, Dihybrid ratio, Law of independent assortment, back cross and Test cross **Neo Mendelism (Gene Interaction)** Genetic interaction, Epistatic interactions –supplementary gene (recessive epistasis 9:3:4), Inhibitory genes (13:3), Masking genes (12:3:1), non-epistatic inter-allelic genetic interactions-Complementary genes (9:7), Duplicate genes (15:1)
2	September	**Multiple alleles** -Definition, Concept, Characters of multiple alleles, Examples of multiple alleles – inheritance of blood group in human, self-incompatibility in Nicotiana and eye colour in Drosophila **Linkage, Recombination and Crossing Over** Linkage- Definition and Types, Crossing over: Definition and Types, Construction of a linkage map by two-point test cross and three-point test cross, Recombination: Concept, definition and types. **Mutation:** Concept, definition and types **Numerical alterations of chromosomes.:** Euploidy, Aneuploidy-Concept and Types, Aneuploidy in Plants and Human, Polyploidy in Plants & Animals, Induced Polyploidy, applications of Polyploidy
3	October	**Structural alterations of chromosomes.:**Types, cytology and genetic effects of Deletion, Duplication Inversion and Translocation with examples**.** **Cytoplasmic & Quantitative Inheritance:** Concept of quantitative inheritance, Inheritance of quantitative trait in Maize (Cob length), Cytoplasmic inheritance Definition and concept, Chloroplast- Varigation in Four O'clock plants, Mitochondria- Petite mutants in yeast. **Sex Linked Inheritance:** Concept of Sex chromosomes and autosomes, Inheritance of X-linked genes –Inheritance of colour blindness in humans, Inheritance of Y-linked (Holandric genes) in humans, Sex influenced genes, Sex-limited genes. **Theory Internal Exam**
4	November	**Revision, Assignment, Previous Question paper discussion** **Theory & Practical Internal and External Exam**

Dr. S. M. Jagtap

Teaching Plan

S.Y.B.Sc. Botany (CBCS): 2023 - 24
BO-231. Taxonomy of Angiosperms and Plant Ecology
(Semester III, Paper I)

Sl. No	Month	Topic
1	August	**1. Introduction to Angiosperm Taxonomy** Definition, Scope, objectives and importance of taxonomy, Exploration, Description, Identification, Nomenclature and Classification Concept of Systematics with brief historical background. 2. **System of classification: Comparative account of various system of classification, Artificial system-Carl Linnaeus**
2	September	2. **System of classification**– Natural System- Bentham and Hooker, Phylogenetic system -Engler and Prantl, APG system -A brief review **3. Study of plant families** Study of following families with reference to systematic position (As per Betham and Hooker's System of classification), Salient features, floral formula, floral diagram and any five examples with their economic importance- Annonaceae , Myrtaceae, Rubiaceae
3	October	**Study of Plant Families** Solanaceae, Apocynaceae,Nyctaginaceae and Amaryllidaceae **Introduction to Ecology:** Definition, concept, scope and interdisciplinary approach, autecology and synecology **Species diversity:** definition, concept, scope and types: Alpha, Beta, and Gamma diversity. **Methods of vegetation sampling:** quadrate method, transect method, plot less method Ecological grouping of plants with reference to their significance of adaptive external and internal features: a) Hydrophytes, b) Mesophytes c) Xerophytes d) Halophytes with examples. **Botanical Nomenclature Concept** of nomenclature, brief history, Binomial nomenclature, international code of nomenclature of Algae, Fungi and Plants (ICN), Principles, **Theory Internal Exam**
4	November	Rules and Recommendation, Type specimen and its types (Holotype, Paratype, Isotype, Lectotype, Neotype). Concept of Typification, Ranks and endings of taxa names, Coining of Genus names and species names Single,double and multipleauthority citation. **Revision, Assignment, Previous Question paper discussion** **Theory and Practical Internal and External Exam**

Dr. Sangeetha J. S.

Teaching Plan

S. Y. B. Sc. Botany; CBCS 2023 -24

BO: 232; Plant Physiology

(Semester III, Paper II)

Sr. No.	Month	Topic
1	August	**Introduction to Plant Physiology** Brief history, Scope and applications of plant physiology **Absorption of water** Role of water in plants
2	September	**Absorption of water contd.** Mechanisms of water absorption with respect to crop plants Factors affecting rate of water absorption **Ascent of sap** Introduction and definition. Transpiration pulls or cohesion-tension theory; evidences and objections Factors affecting ascent of sap **Revision, Assignment**
3	October	**Transpiration** Definition Types of transpiration – cuticular, lenticular and stomatal Structure of stomata Mechanism of opening and closing of stomata –Steward's hypothesis, Active K+ transport mechanism Factors affecting the rate of transpiration **Theory Internal Examination**
4	November	**Transpiration (cont.)** Significance of transpiration Antitranspirants Guttation Exudation **Revision, Assignment** **Question paper discussion** **Practical Internal Examination**

Dr. K. M. Nitnaware

Teaching Plan

F. Y. B. Sc. - Botany: 2023-24
Plant life and utilization I (BO 111)
(Semester – I; Paper – I)

Sr. No.	Month	Topics
1	July	**INTRODUCTION -** General outline of plant kingdom (Lower Cryptogams: Thallophytes- Algae, Fungi & Lichens; Higher Cryptogams: Bryophytes and Pteridophytes; Phanerogams: Gymnosperms and Angiosperms- Dicotyledons and Monocotyledons). Distinguishing characters of these groups and mention few common examples from each. **Revision and Assignment**
2	August	**ALGAE –** Introduction, General Characters, Classification (Bold and Wynne 1978) up to classes with reasons. Life Cycle of ***Spirogyra***w.r.t. Habit, Habitat, Structure of thallus, structure of typical cell, Reproduction- Vegetative, Asexual and Sexual, systematic position with reasons.Utilization of Algae in Biofuel Industry, Agriculture, Pharmaceuticals, Food and Fodder **Revision and Assignment**
3	September	**LICHENS** – Introduction, General Characters, Nature of Association, forms- Crustose, Foliose and Fruticose. Utilization of lichens. **FUNGI –** Introduction, General Characters, Classification (Ainsworth, 1973). Life Cycle of Mushroom- ***Agaricusbisporus***w.r.t. Habit, Habitat, Structure of thallus, Structure of SporocarpStructure of Gill, Reproduction- Asexual and sexual, Systematic position. Utilization of Fungi in Industry, Agriculture, Food and Pharmaceuticals. **Revision and Assignment**
4	October	**BRYOPHYTES –** Introduction, General Characters, Classification (G.M. Smith 1955) Life Cycle of ***Riccia***w.r.t. Habit, habitat, external and internal structure of thallus, Reproduction- vegetative, asexual and sexual- Structure of sex organs, fertilization, Structure of mature sporophyte, structure of spore, systematic position with reasons. Utilization: Bryophytes as ecological indicators, agriculture, fuel, industry and medicine **Revision and Assignment** **Theory Internal Exam**
5	November	**Practical Internal & External Exam**

Dr. K. M. Nitnaware

Teaching Plan

F. Y. B. Sc. - Botany: 2023-24

Plant Morphology and Anatomy (BO 112)

(Semester – I; Paper – II)

Sr. No	Month	Topics
1	August	**MORPHOLOGY** Introduction, definition, descriptive and interpretative morphology. Importance in identification, nomenclature, classification, phylogeny and Plant breeding. **Revision and Assignment, Tutorial** **MORPHOLOGY OF REPRODUCTIVE PARTS: INFLORESCENCE** Introduction and definition, Types: a) Racemose -Raceme, Spike, Spadix, Corymb, Umbel, Catkin and Capitulum. b) Cymose -Solitary, Monochasial- Helicoid and scorpiod; Dichasial and Polychasial. c) Special types -Verticillaster, Cyathium and Hypanthodium; Significance. **Revision and Assignment, Tutorial** **FLOWER** Introduction and definition, Parts of a typical flower: Bract, Pedicel, Thalamus- forms, Perianth- Calyx and Corolla, Androecium and Gynoecium. Symmetry: Actinomorphic and zygomorphic, Sexuality- Unisexual and bisexual, Insertion of floral whorls on thalamus- Hypogyny, Epigyny and perigyny, Merous condition-Trimerous, tetrmerous and pentamerous. Floral whorls: a) **Calyx:** Nature- Polysepalous, Gamosepalous; Aestivation- types, Modifications of Calyx- Pappus, Petaloid and Spurred. b) **Corolla:** Forms of Corolla- i) Polypetalous- Cruciform and Papilionaceous. ii) Gamopetalous- Infundibuliform, Bilabiate, Tubular and Campanulate. iii) Aestivation- types and significance. c) **Perianth:** Nature- Polytepalous, Gamotepalous.
2	September	d) **Androecium:** Structure of typical stamen, Variations- cohesion and adhesion. e) **Gynoecium:** Structure of typical carpel, number, position, cohesion and adhesion; placentation- types and significance. **Revision and Assignment, Tutorial** **FRUITS** Introduction and definition. Types of fruits: a) **Simple:** Indehiscent - Achene, Cypsela, Nut and Caryopsis; Dehiscent - Legume, Follicle and Capsule, b) **Fleshy:** Drupe, Berry, Hespiridium and Pepo. c) **Aggregate:** Etaerio of Berries and Etaerio of Follicles. d) **Multiple fruits:** Syconus and Sorosis. **Revision and Assignment, Tutorial** **ANATOMY** Introduction and definition Importance in Taxonomy, Physiology, Ecological interpretations, Pharmacongnosy and Wood identification.

		Revision and Assignment, Tutorial **TYPES OF TISSUES** Outline with brief description, simple and complex tissues
3	October	**Meristmatic tissues:** Meristem, characters and types based on origin, position and plane of division, functions. **Permanent tissues:** Simple tissues - parenchyma, collenchymas, chlorenchyma and sclerenchyma. **Complex/Vascular tissues:** Components of xylem and phloem, types of vascular bundles and functions. **Epidermal tissues:** Epidermis, structure of typical stomata, trichomes, motor cells; functions. **Revision and Assignment, Tutorial** **INTERNAL ORGANIZATION OF PRIMARY PLANT BODY** Internal structure of dicotyledon and monocotyledon root. Internal structure of dicotyledon and monocotyledon stem. Internal structure of dicotyledon and monocotyledon leaf. **Revision and Assignment, Tutorial**
4	November	**Theory and Practical Internal Exam** **Theory and Practical external Exam**

Dr. Sangeetha J.S.